January 2011

National Listing of Fish Advisories NEWSLETTER

Recent Advisory News

Pennsylvania issues updated fish consumption advisories for 2011

The Pennsylvania Department of Environmental Protection recently released an updated list of fish consumption advisories. Among the changes are eight new advisories for mercury and one for polychlorinated biphenyls (PCBs). Four advisories were rescinded and three were revised with different meal advice.

Link to original article: http://www.prnewswire.com/news-releases/pennsylvania-dep-issues-updated-fish-consumption-advisories-for-2011-112086379.html

Source: PR Newswire, 12/17/2010

State supermarket group to women: eat healthy fish

The Connecticut Food Association, a trade group that represents most large Connecticut supermarkets, is working with the Connecticut Department of Public Health to urge women to eat healthy fish varieties. In November, the group began posting advice cards and signs at many supermarket seafood counters. The cards explain the benefits of species such as trout, wild salmon, sole and flounder which are lower in chemical contaminants than many other species of fish.

Link to original article: http://www.norwichbulletin.com/newsnow/x1892564835/State-supermarket-group-to-women-eat-healthy-fish

Source: Norwich Bulletin, 11/ 21/2010

Seafood at local supermarkets tests high for mercury

Mercury testing done by nonprofit group GotMercury.org found that swordfish at eight Santa Cruz County supermarkets contained levels of the toxic metal in excess of the FDA limit. Tuna did not contain mercury above the federal standard at any local market.

Link to original article: http://www.santacruzsentinel.com/business/ci_16665441

Source: Santa Cruz Sentinel (CA), 11/20/2010.

Could your seafood contain toxic chemicals?

A recent NBC investigation found that some of the seafood imported to the United States may contain chemical drug residues. The program cites shrimp, catfish, crabmeat and tilapia imported to the United States from China, Taiwan, Vietnam, Malaysia and Indonesia as problematic due to high levels of drugs such as chloramphenicol, nitrofurans and malachite green. Results from seafood tests conducted by the departments of agriculture in Alabama, Okla-

homa, Mississippi and Georgia have shown evidence of contamination.
Link to original article: http://today.msnbc.msn.com/id/40198123/ns/today-today_health/

Source: MSNBC.com, 11/17/2010

Study: Mercury levels elevated in Martin County, Florida women

After a recent study showed that 25 percent of women in Martin County, Florida had elevated levels of mercury, the county health department is advising women to avoid eating fish.
Link to original article: http://www.wptv.com/dpp/news/region_martin_county/study%3A-mercury-levels-elevated-in-martin-county-women

Source: WPTV.com, 12/14/2010

New EPA rules target airborne mercury emissions from gold mining

The U.S. Environmental Protection Agency recently released rules to curb mercury emissions from gold mining. Eight of the newly-regulated gold operations are in Nevada and have been suspected as a source of mercury in Utah lakes and streams.
Link to original article: http://www.sltrib.com/sltrib/home/50896637-76/mercury-gold-lake-utah.html.csp

Source: The Salt Lake Tribune (UT), 12/17/2010

Remedial activity at Iron Mountain Mine included collecting and treating acid drainage from mine run off. Iron Mountain Mine was mining factory for gold, copper and zinc.

Recent Publications

Please note: The following abstracts are reprinted verbatim unless otherwise noted.

Deleterious effects in mice of fish-associated methylmercury contained in a diet mimicking the Western populations' average fish consumption

Methylmercury (MeHg) is a potent neurotoxin, and human beings are mainly exposed to this pollutant through fish consumption. Only a few contradictory epidemiological studies are currently available examining the impact of fish consumption on human populations. In the present study, we wanted to address whether a diet mimicking the fish consumption of Western populations could result in observable adverse effects in mice, and whether beneficial nutriments from fish were able to counterbalance the deleterious effects of MeHg, if any. In Europe and the United States, fish consumption varies widely between countries, from 11 to 100g fish/day. A mid-range value of 25g fish/day corresponds to a fish contribution to the total diet of 1.25% on a dry weight basis. We decided to supplement a vegetarian-based mouse diet with 1.25% of lyophilized salmon flesh (SAL diet), or 1.25% of a blend of lyophilized cod, tuna, and swordfish (CTS diet). Total mercury contents were 1.15+/-0.15, 2.3+/-0.1 and 35.75+/-0.15ng Hg/g of food pellets for the control, SAL and CTS diets, respectively. After two months feeding, the CTS diet resulted in significant observable effects as compared to the control and SAL diets, encompassing decreased body growth, altered behavioral performance and increased anxiety level, modification of mitochondrial respiratory protein subunit concentrations in kidney and brain structures, modified gene expression patterns in kidneys, liver and muscles, and a decrease of dopamine concentrations in the hypothalamus and striatum. Our findings have health implications, firstly because 1.25% of CTS flesh in the diet corresponds to an average exposure to MeHg below the WHO provisory tolerable weekly intake (PTWI) (1.6µg MeHg/kg of body weight/week), and secondly because many people in Western populations, among them women of child-bearing age, are exceeding the PTWI value (for instance, 35% of the French population inhabiting the Atlantic and Mediterranean coasts).

Source: Bourdineaud, J. P., M. Fujimura, et al. (2010). "Deleterious effects in mice of fish-associated methylmercury contained in a diet mimicking the Western populations' average fish consumption." Environ Int 2010 Oct 28. [Epub ahead of print].

Conferences

Society of Toxicology 50th Anniversary Meeting
March 6–10, 2011 Washington DC
http://www.toxicology.org/AI/MEET/AM2011/

10th International Conference on Mercury as a Global Pollutant
July 24–29, 2011 Halifax, Nova Scotia, Canada
http://www.mercury2011.org/

American Fisheries Society Annual Meeting
September 4-8, 2011 Seattle, Washington
http://www.fisheries.org/afs2011

National Forum on Contaminants in Fish
Fall 2011 – Stay tuned for details and location!

Flood Hydrology and Methylmercury Availability in Coastal Plain Rivers

Mercury (Hg) burdens in top-predator fish differ substantially between adjacent South Carolina Coastal Plain river basins with similar wetlands coverage. In the Congaree River, floodwaters frequently originate in the Blue Ridge and Piedmont regions, where wetlands coverage and surface water dissolved methylmercury (MeHg) concentrations are low. Piedmont-driven flood events can lead to downward hydraulic gradients in the Coastal Plain riparian wetland margins, inhibiting MeHg transport from wetland sediments, and decreasing MeHg availability in the Congaree River habitat. In the adjacent Edisto River basin, floodwaters originate only within Coastal Plain sediments, maintaining upward hydraulic gradients even during flood events, promoting MeHg transport to the water column, and enhancing MeHg availability in the Edisto River habitat. These results indicate that flood hydrodynamics contribute to the variability in Hg vulnerability between Coastal Plain rivers and that comprehensive regional assessment of the relationship between flood hydrodynamics and Hg risk in Coastal Plain streams is warranted.

Source: Bradley, P. M., C. A. Journey, et al. (2010). "Flood Hydrology and Methylmercury Availability in Coastal Plain Rivers." Environ Sci Technol 44 (24): 9285-9290.

Gender differences in resource use and evaluation of attributes of places of resource use by Native Americans and Caucasians from Western Idaho: relevance to risk evaluations

A substantial body of literature deals with exposure differences between men and women, and how men and women perceive environmental risk, but far less attention has been devoted to how men and women use the environment and how they evaluate the features of natural environments. The objective of this study was to examine gender differences in the perceptions of environmental quality and resource use for Native Americans and Caucasians interviewed at an Indian festival in northwestern Idaho. More individuals engaged in fishing than any other consumptive activity, and more people engaged in camping and hiking than other nonconsumptive activities. For both ethnic groups, significantly more men hunted than women, although a higher percentage of Native Americans of both genders hunted than did Caucasians. Although significantly more Caucasian men fished than women (63 vs. 41%), there were no marked differences in fishing for Native Americans. Significantly more Native American women gathered

herbs (57%) compared to men (37%). There were no significant gender differences in nonconsumptive activities (camping, hiking, biking, bird watching, or picnicking). For those who engaged in consumptive and nonconsumptive activities, however, there were few gender differences in the frequency of these activities, except for fishing, hunting, and crabbing by Caucasians (men had higher rates) and collecting berries and herbs for Native Americans (women had higher rates). When asked to evaluate environmental characteristics or attributes on a scale of 1 (less important) to 5 (very important), unpolluted water, clean air, no visible smog, unpolluted groundwater, and appears unspoiled were rated the highest. There were few significant gender differences in these evaluations for Native Americans, but there were significant gender differences for Caucasians: Women rated most features higher than did men (except for natural tidal flow). These data indicate a need to evaluate not only consumption rate differences between men and women, but also nonconsumptive activities, as well as resource values and perceptions, when managing environments and determining potential risk from exposure.

Source: Burger, J. and M. Gochfeld (2010). "Gender differences in resource use and evaluation of attributes of places of resource use by Native Americans and Caucasians from Western Idaho: relevance to risk evaluations." J Toxicol Environ Health A 73(24): 1655-1664.

Benefits versus risks associated with consumption of fish and other seafood

Fish provide nutrition for much of the world's population, and when not contaminated with chemicals, fish is a very good food. A major benefit of fish is that they are high in polyunsaturated fatty acids (PUFAs), low in saturated fat, and they contain other critical nutrients. Much of the benefit of fish consumption derives from their high levels of long chain omega-3 PUFAs, which are produced by aquatic microorganisms and bioconcentrate in the aquatic food supply. The PUFAs are essential, in that humans and other vertebrates are not able to synthesize them and therefore must obtain them from the diet. The PUFAs particularly concentrate in the nervous system, alter immune system function reduce serum triglyceride levels and have been reported to reduce the risk of sudden death after a myocardial infarction. But the problem is that most fish have at least some degree of chemical contamination with methylmercury, (which binds to muscle) and/or with persistent organic pollutants such as dioxins, polychlorinated biphenyls, polybrominated diphenyl ethers, chlorinated pesticides (which concentrate in fish fat). These chemicals have adverse effects on nervous system function, modulate the immune system, and are associated with elevations in risk of cardiovascular disease. Thus the question of benefits and risk from fish consumption is complex but very important.

Source: Bushkin-Bedient, S. and D. O. Carpenter (2010). "Benefits versus risks associated with consumption of fish and other seafood." Rev Environ Health 25(3): 161-191.

N-3 fatty acids and periodontitis in US adults

Periodontitis is a common, chronic inflammatory disease. Although n-3 fatty acids have anti-inflammatory properties, it is unclear whether n-3 fatty acids can treat or prevent periodontitis. We studied 9,182 adults aged 20 years and older who participated in the National Health and Nutrition Examination Survey between 1999 and 2004. Periodontitis was assessed by dental exam and was defined as >4 mm pocket depth and >3 mm attachment loss in any one tooth. Intake of n-3 fatty acids was assessed by 24-hour dietary recall. We used multivariable logistic regression to estimate the associations between periodontitis and intakes of docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA), and linolenic acid (LNA). The weighted prevalence and 95% confidence interval (CI) of periodontitis was 8.2% (95% CI 7.0 to 9.4). Compared with the lowest tertiles, the adjusted odds ratios for periodontitis associated with the highest tertiles of dietary n-3 intake were 0.78 (95% CI 0.61 to 1.00; P=0.009) for DHA, 0.85 (95% CI 0.67 to 1.08; P=0.10) for EPA, and 0.86 (95% CI 0.60 to 1.23; P=0.28) for LNA. The associations were little changed by multivariable adjustment or exclusion of individuals reporting use of dietary supplements containing DHA, EPA, or LNA. In this nationally representative sample, higher dietary intakes of DHA and, to a lesser degree, EPA, were associated with lower prevalence of periodontitis. Interventional studies are needed to confirm the potential protective effects of n-3 fatty acids on periodontitis.

Source: Naqvi, A. Z., C. Buettner, et al. (2010). "n-3 fatty acids and periodontitis in US adults." J Am Diet Assoc 110(11): 1669-1675.

Seafood intake and urine concentrations of total arsenic, dimethylarsinate and arsenobetaine in the US population

BACKGROUND: Seafood is the main source of organic arsenic exposure (arsenobetaine, arsenosugars and arsenolipids) in the population. Arsenosugars and arsenolipids are metabolized to several species including dimethylarsinate (DMA). OBJECTIVE: Evaluate the association of seafood intake with spot urine arsenic concentrations in the 2003-2006 National Health Nutrition and Examination Survey (NHANES). METHODS: We studied 4276 participants >/=6 years. Total arsenic was measured using inductively coupled plasma dynamic reaction cell mass spectrometry (ICPMS). Urine DMA and arsenobetaine were measured by high-performance liquid chromatography coupled with ICPMS. RESULTS: Participants reporting seafood in the past 24-h had higher urine concentrations of total arsenic (median 24.5 vs. 7.3mug/L), DMA (6.0 vs. 3.5mug/L), arsenobetaine (10.2 vs. 0.9mug/L) and total arsenic minus arsenobetaine (11.0 vs. 5.5mug/L). Participants reporting seafood >/=2/wk vs. never during the past year had 2.3 (95% confidence interval 1.9, 2.7), 1.4 (1.2, 1.6), 6.0 (4.6, 7.8) and 1.7 (1.4, 2.0) times higher (p-trend <0.001) concentrations of total arsenic, DMA, arsenobetaine and total arsenic minus arsenobetaine, respectively. In participants without detectable arsenobetaine and in analyses adjusted for arsenobetaine, seafood consumption in the past year was not associated with total arsenic or DMA concentrations in urine. CONCLUSION: Seafood intake was a major determinant of increased urine concentrations of total arsenic, DMA, arsenobetaine and total arsenic minus arsenobetaine in the US population. Epidemiologic studies that use total arsenic, DMA, the sum of inorganic arsenic, methylarsonate and DMA, and total arsenic minus arsenobetaine as markers of inorganic arsenic exposure and/or metabolism need to address seafood intake.

Source: Navas-Acien, A., K. A. Francesconi, et al. (2010). "Seafood intake and urine concentrations of total arsenic, dimethylarsinate and arsenobetaine in the US population." Environ Res 2010 Nov 18. [Epub ahead of print].

Screening Level Assessment of Risks Due to Dioxin Emissions from Burning Oil from the BP Deepwater Horizon Gulf of Mexico Spill

Between April 28 and July 19 of 2010, the U.S. Coast Guard conducted in situ oil burns as one approach used for the management of oil spilled after the explosion and subsequent sinking of the BP Deepwater Horizon platform in the Gulf of Mexico. The purpose of this paper is to describe a screening level assessment of the exposures and risks posed by the dioxin emissions from these fires. Using upper estimates for the oil burn emission factor, modeled air and fish concentrations, and conservative exposure assumptions, the potential cancer risk was estimated for three scenarios: inhalation exposure to workers, inhalation exposure to residents on the mainland, and fish ingestion exposures to residents. U.S. EPA's AERMOD model was used to estimate air concentrations in the immediate vicinity of the oil burns and NOAA's HYSPLIT model was used to estimate more distant air concentrations and deposition rates. The lifetime incremental cancer risks were estimated as 6×10^{-8} for inhalation by workers, 6×10^{-12} for inhalation by onshore residents, and 6×10^{-8} for fish consumption by residents. For all scenarios, the risk estimates represent upper bounds and actual risks would be expected to be less.

Source: Schaum, J., M. Cohen, et al. (2010). "Screening Level Assessment of Risks Due to Dioxin Emissions from Burning Oil from the BP Deepwater Horizon Gulf of Mexico Spill." Environ Sci Technol 44(24): 9383-9389.

Two fishing vessels drag an oil boom after trapped oil is set ablaze in the Gulf of Mexico May 6.

The following recent publications are also of interest, but their abstracts are not reprinted here due to copyright restrictions:

Mercury in wahoo, *Acanthocybium solandri*, from offshore waters of the southeastern United States and the Bahamas

Douglas H. Adams. 2010. "Mercury in wahoo, Acanthocybium solandri, from offshore waters of the southeastern United States and the Bahamas." Marine Pollution Bulletin, Volume 60, Issue 1, January 2010, Pages 148-151.

Mercury contamination in spotted seatrout, *Cynoscion nebulosus*: An assessment of liver, kidney, blood, and nervous system health

Douglas H. Adams, Christian Sonne, Niladri Basu, Rune Dietz, Dong-Ha Nam, Pall S. Leifsson, Asger L. Jensen. 2010. "Mercury contamination in spotted seatrout, Cynoscion nebulosus: An assessment of liver, kidney, blood, and nervous system health." Science of The Total Environment, Volume 408, Issue 23, Special Section: Integrating Water and Agricultural Management Under Climate Change, 1 November 2010, Pages 5808-5816.

An evaluation of mercury levels in Louisiana fish: Trends and public health issues

Katner, A., M.-H. Sun, et al. (2010). "An evaluation of mercury levels in Louisiana fish: Trends and public health issues." Science of the Total Environment [Sci. Total Environ.]. 408(23): 5707-5714.

External exposure and bioaccumulation of PCBs in humans living in a contaminated urban environment

Norstroem, K., G. Czub, et al. (2010). "External exposure and bioaccumulation of PCBs in humans living in a contaminated urban environment." Environment International [Environ. Int.]. 36(8): 855-861.

Protective effects of selenium against DNA adduct formation in Inuit environmentally exposed to PCBs

Ravoori, S., C. Srinivasan, et al. (2010). "Protective effects of selenium against DNA adduct formation in Inuit environmentally exposed to PCBs." Environment International [Environ. Int.]. 36(8): 980-986.

Additional Information

For more information about specific advisories within a state, contact the appropriate state agency listed on EPA's NLFA Web site at http://water.epa.gov/scitech/swguidance/fishshellfish/fishadvisories/advisories_index.cfm

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For more information about the NLFA or EPA's Fish Advisory Program, contact:

The NLFA Newsletter at Fish_Advisory@epa.gov or Jeff Bigler, National Program Manager Fish Advisory Program

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